

Pogo Mine
Initial CISWI Performance Test
Incinerator Parameters / Operating Limits Petition

Sumitomo Metal Mining Pogo LLC (Pogo) operates a small remote incinerator that is subject to 40 CFR 60 Subpart CCCC, *Standards of Performance for Commercial and Industrial Solid Waste Incineration Units* (CISWI Units). Because construction of this incinerator commenced after June 4, 2010, it is defined in § 60.2015(a)(1) as a new CISWI unit.

According to § 60.2015(a), the incinerator is subject to the emission limits in Table 8 of Subpart CCCC. Pogo intends to conduct source testing at the end of September, 2013 to quantify emissions from the incinerator. Emissions are limited by proper operation and maintenance of the incinerator according to the manufacturer's specifications, and no add-on control device is utilized. As required by §60.2115, Pogo hereby petitions the EPA Administrator for specific operating limits to be established during the initial performance test and continuously monitoring thereafter.

The subject incinerator is an ACS Inc. Model PC 0400-VO5-RC6. The unit has one 800,000 Btu/hr primary chamber propane burner, and two 800,000 Btu/hr secondary chamber propane burners. Both chambers are equipped with modulating combustion air blowers. Please note that this unit fires only propane as fuel. Pogo does not incinerate their waste oil.

The following paragraphs provide the information specified in §60.2115(a) through (e).

(a) Identification of the specific parameters you propose to use as additional operating limits.

Pogo has identified seven (7) specific incinerator parameters for use as operating limits:

- Waste Charge-Rate Limit: Maximum charge weight, as a 3-hr rolling average;
- Charge Interval Limit: Minimum time interval between waste charges;
- Primary Combustion Chamber Temperature Limit: Minimum temperature, as a 1-hour rolling average of 5-minute average temperature values;
- Primary Combustion Chamber Burn Time Limit: Minimum burn time = 5 hours after the final load is charged to the primary chamber;
- Secondary Combustion Chamber Temperature Limit: Minimum temperature, as a 1-hour rolling average of 5-minute average temperature values;
- Secondary Combustion Chamber Burn Time Limit: Minimum = 1 hour burn time after the end of the primary chamber burn cycle; and
- Waste Composition: The average daily (i.e., batch) composition of waste burned. The specific parameters are the weight percent of each type of waste (MSW, sludge and rags/wipes) as 365-day rolling average values.

Based on process data and analytical results of the June 2013 source test, as well as incinerator records of waste types burned in the past year, Pogo proposes the operating limits summarized in Table 1 (the June 2013 source test report is being submitted to EPA with this revised petition).

TABLE 1
OPERATING LIMITS

| Parameter | Operating Limit | Averaging Period | Basis |
|--|---|--|--|
| Charge Rate | Maximum charge weight = 48 pounds ¹ | Individual charge weight to be determined as a 3-hour rolling average | 110% of the average charge weight during the June 2013 source test program |
| Charge Interval | Minimum time interval between waste charges = 15 minutes | NA - Each charge is subject to this operating limit | Incinerator manufacturer default specification; and minimum interval monitored in the June 2013 source test |
| Primary Combustion Chamber Temperature | Minimum primary chamber temperature = 1,500°F ¹ | Five-minute average temperature measurement as a 1-hour rolling average | Within 10% of the average temperature recorded during the June 2013 source test |
| Primary Chamber Burn Time | Minimum burn time = 5 hours after the final load is charged | NA - Each charge is subject to this operating limit | Incinerator manufacturer default specification |
| Secondary Combustion Chamber Temperature | Minimum secondary chamber temperature = 1,800°F ¹ | Five-minute average temperature measurement as a 1-hour rolling average | Within 10% of the average temperature recorded during the June 2013 source test |
| Secondary Chamber Burn Time | Minimum burn time = 1 hour after completion of the primary burn cycle | NA - Each charge is subject to this operating limit | Incinerator manufacturer default specification |
| Waste Composition | 70% - 86% MSW, 7% - 13% Sludge, 9% - 15% Rags, per Daily Batch ¹ | Daily (batch) percentage of each waste component to be determined as a 365-day rolling average | Percentages are the annual averages of waste composition percentages: May 2, 2012 through August 15, 2013 ² |

¹May be reestablished with parametric monitoring data from the September 2013 performance test, as provided in 40 CFR § 60.2145(c)

²Incinerator operating records are attached to this revised petition

Pogo is in the process of purchasing an electronic Data Acquisition System (DAS) which will automatically monitor these parameters. The DAS will not be installed by the September 2013 performance test. During the September 2013 performance test, all identified operating parameters will

be monitored and the measured values will be recorded by hand. During the June 2013 source test, Pogo was able to accurately monitor and record these values.

(b) A discussion of the relationship between these parameters and emissions of regulated pollutants, identifying how emissions of regulated pollutants change with changes in these parameters and how limits on these parameters will serve to limit emissions of regulated pollutants.

The following discussion presents a brief description of the incinerator combustion process, the relationship between emissions of regulated pollutants and the parameters identified above, how emissions of these pollutants change with changes in these parameters, and how limits on the these parameters will serve to limit emissions of regulated pollutants.

Combustion Process Description

Emissions of regulated pollutants are minimized through proper and complete combustion of waste in the incinerator. The burnable, hydrocarbon constituents of the waste, as well as intermediate compounds formed as the waste is heated, are ideally oxidized to form carbon dioxide and water vapor, while the inert constituents are reduced to ash. Combustion is conducted in two parts within the primary combustion chamber and the secondary combustion chamber.

The incinerator is used only to burn the following wastes:

- Municipal solid waste (MSW) comprised of a roughly even mix of Type 2 waste (i.e., refuse consisting of rubbish and garbage from residential sources) and Type 3 waste (garbage consisting of animal and vegetable food wastes),
- sewage sludge from Pogo's wastewater treatment facility, and
- rags/wipes from maintenance activities.

While the relative amounts of the constituents vary on a short-term basis, the annual average composition is approximately 78% MSW, 10% sludge, and 12% rags.

Primary Combustion Process

In the primary combustion step, the thermal destruction of solid waste is accomplished in four phases: (1) drying, (2) volatilization of vapors and gases, (3) in-place oxidation of burnable solids, and 4) final burn-down of char and the consolidation and cooling of inert residues (i.e., bottom ash).

- The drying phase occurs in the initial heating of the waste material in the primary oven. Moisture is driven off as the material is heated past the vaporization temperature of water. Drying is usually complete by the time the material has reached 300°F.
- In the second phase, vapors and gases diffuse out as the material temperature increases and their respective volatilization temperatures are reached. Gases having lower flash points react with primary combustion air to burn at the surface of the waste-bed. Higher flash point gases are most

likely to burn after they have been entrained in the air flow and ignite when exposed to their respective ignition temperatures. Because the flash points of these gases range between approximately 500°F and 1,300°F, combustion occurs some distance above the bed where sufficient temperature and oxygen are present.

- Through further heating in the third phase, the remaining, partially oxidized cellulose, lignins, and other hydrocarbon solids are oxidized to form carbon dioxide and water vapor. The residues from this phase are incompletely burned hydrocarbons (char) and inert non-combustibles.
- In the fourth phase of the combustion process, the final burn-down of the char and the consolidation of the inert materials take place. After a short cooling period, this residual bottom ash is dropped into the ash-receiving system.

Secondary Combustion Process

Secondary combustion completes the final destruction of the waste. The secondary combustion zone provides the desired temperature, turbulence and excess air required to completely oxidize all the unburned vapors, gases, and particulates released from the primary combustion process. For this reason, the secondary chamber is designed with a sufficient volume to ensure the high-temperature residence time required to complete the oxidation of the most difficult to burn materials (i.e., high-flash-point and low-heat-content vapors).

Incinerator Operating Parameters and Operating Limits

As discussed above, the key operating parameters include charge weight, charge interval, primary and secondary chamber temperatures and burn durations, and waste composition. The operating limits of these key parameters have been tentatively established during the June 2013 performance test, and may be reestablished by the upcoming September 2013 test. Maintenance of all parameters within the established operating limits ensures continuous proper performance of the incinerator, which in turn ensures no increase in the pollutant emission levels measured during the performance test.

(c) A discussion of how you will establish the upper and/or lower values for these parameters which will establish the operating limits on these parameters.

This section contains a discussion of how the maximum and/or minimum values will be established for the operating parameters identified above.

- The individual load weight limit is a maximum value only. During the September 2013 performance test, each load will be weighed and the weight recorded. The maximum allowable load weight will be established as 110 percent of the average load weight measured during the September 2013 source test, as a 3-hour rolling average.
- The load interval limit is a minimum value of 15 minutes. The manufacturer's operation manual specified this interval as a default value, designed to provide sufficient time between waste-loads

for complete combustion of the maximum design load weight. During the September 2013 performance test, the load interval will be monitored and recorded.

- The primary oven temperature limit is a minimum value of 1,500°F. This temperature limit will be continuously monitored and recorded at 5-minute intervals during the September 2013 performance test to establish the operating limit. The operating limit of 1,500°F was within less than 10 percent of the average of all primary chamber temperatures measured during the June 2013 source test program.
- The primary burn-down time limit is a minimum value of 5 hours. The 5-hour burn time begins when the final waste load is charged to the primary chamber (i.e., when the operator activates the “Feedram Extend” button). This parameter will be monitored and recorded during the September 2013 performance test to establish the applicable operating limit.
- The secondary oven temperature limit is a minimum value of 1,800°F. This temperature limit will be continuously monitored and recorded at 5-minute intervals during the September 2013 performance test to establish the operating limit. The operating limit of 1,800°F was within less than 10 percent of the average of all secondary chamber temperatures measured during the June 2013 source test program.
- The secondary burn time is a minimum value of 1 hour. The 1-hour burn time begins when the primary burn cycle is completed. This parameter will be monitored and recorded during the performance test to establish the applicable operating limit.
- The waste composition ranges of MSW, sludge, and rags have been established using actual incinerator records for the period of May 2, 2012 through August 15, 2013 (360 operating days). The operating ranges were set as ± 8 percent of the annual average for the MSW fraction and ± 3 percent of the annual average for the sludge and rags/wipes. The September 2013 performance test will be conducted with the incinerator burning a waste composition that closely approximates the annual average percentages, and the operating ranges may be reestablished based on the composition during the performance test.

(d) A discussion identifying the methods you will use to measure and the instruments you will use to monitor these parameters, as well as the relative accuracy and precision of these methods and instruments.

Monitoring Methods

Table 2 is a summary of the Operating Limits Continuous Monitoring Plan. The methods to be used to measure and continuously monitor the operating limits are discussed in the following paragraphs. As noted above, the electronic data acquisition system will be installed following the September 2013 performance test.

The composition and total weight of each charge will be measured and recorded in the DAS. On a per-charge basis, the three-hour rolling average weight will be calculated. Compliance with the maximum load-weight operating limit will be determined as the three-hour rolling average weight.

For the load interval operating limit, the start time and end time of each load interval will be monitored through the DAS. The load interval will begin when the operator activates the “Feedram Extend” button, and end when the same button is activated for the next load. Each load interval will be continuously measured by the control system electronic clock recorded by the DAS for determining compliance with the operating limit.

For the primary-chamber and secondary-chamber temperature limits, continuous monitoring will be conducted by the DAS interface with the incinerator’s control unit. The DAS will determine 5-minute average temperatures for each combustion chamber. Compliance with the minimum temperature limits will be determined as the 1-hour rolling average temperature for each 5-minute average measurement.

For burn time operating limits, the start time and end time of each chamber will be monitored through the DAS. The primary chamber burn time will begin when the final load is charged to the primary chamber and continuously measured using an electronic clock until the primary burn cycle is completed. The secondary chamber burn time will begin when the primary burn cycle is completed, and continuously monitored using an electronic clock until the secondary burn cycle is completed. Each total burn time will be used to determine compliance with the applicable operating limit.

The waste composition operating ranges are determined by the incinerator operating data from May 3, 2012 through August 15, 2013 (360 operating days). The operating ranges in Table 2 are based on the annual average waste component percentages of 78% MSW, 10% sludge, and 12% rags. The September 2013 performance test will be designed such that test runs will be conducted during the incineration of waste batches that approximate those annual average percentages. Following the performance test, the operating ranges may be reestablished according to the waste composition actually measured during the test program, as specified in 40 CFR § 60.2145(c). The operator will enter into the DAS the weights and component-types of all bags charged. On a daily (i.e., batch) basis, the most percentage of each component will be calculated as a 365-day rolling average.

TABLE 2
OPERATING LIMITS MONITORING PLAN MATRIX

| Parameters Identified as Operating Limits | Operating Limits Upper/Lower Values | Continuous Measurement Methods | Measurement Frequency and Averaging Periods |
|--|---|---|---|
| Charge Rate | Maximum Load Weight = 110% of average load weight during September 2013 source test program | Charge-weight data-entry to DAS | Weigh and record each load prior to charging into incinerator. 3-Hour rolling average of charge rate calculated by DAS |
| Charge Interval | Minimum Interval Between Loads = 15 Minutes | DAS interface with Control System's Clock | Interval start times recorded by DAS |
| Primary Chamber Temperature | Minimum Temperature in Primary Chamber = 1,500°F | DAS and K-Type Thermocouple | DAS to continuously measure and record temperature, derive 5-minute average values, and determine 1-Hour rolling average of the 5-min average temperatures. |
| Primary Chamber Burn Time | Minimum Burn Time = 5 Hours Following Final Waste-Load Charge | DAS interface with Control System's Clock | Start time of final charge time of primary cycle completion recorded by DAS |
| Secondary Chamber Temperature | Minimum Temperature in Secondary Chamber = 1,800°F | DAS and K-Type Thermocouple | DAS to continuously measure and record temperature, derive 5-minute average values, and determine 1-Hour rolling average of the 5-min average temperatures. |
| Secondary Chamber Burn Time | Minimum Burn Time = 1 Hours Following Completion of the Primary Burn Cycle | DAS interface with Control System's Clock | Time of primary cycle completion and time of secondary burn completion recorded by DAS |
| Waste Composition | 70% - 86% MSW 7% - 13% Sludge 9% - 15% Rags | Charge-weight data-entry to DAS | Weigh and record each load prior to charging into incinerator. 365-day rolling average calculated daily by DAS |

Monitoring Instruments

The instruments to be used for measuring the parameters identified as operating limits are discussed below.

- Waste Load Weight. Each bag comprising each incinerator-charge is weighed immediately prior to loading on a Cardinal Model No. 205 electronic weight indicator connected to a Cardinal Model SB-2500S floor scale. The scale has an accuracy of 0.5 pound, or approximately ± 1 percent, of the maximum waste load operating limit.
- Load Interval, Primary and Secondary Burn Times. The automatic, computer-based control unit incorporates internal electronic timers that are extremely accurate. The DAS will interface with the electronic clock and timers displayed on the control unit to measure the load interval and burn times at the frequencies listed in Table 2.
- Primary and Secondary Burn Temperatures. The temperature measurements will be performed using Type K thermocouples mounted in each combustion chamber. The Type K thermocouple has an accuracy of ± 0.4 percent at the operating temperatures of the primary and secondary chambers. The control unit presents digital displays of real time chamber temperatures. The DAS will interface with the incinerator's control unit and thermocouple output will be continuously recorded. The DAS will be programmed to calculate five-minute average temperature values, and use these values to calculate one-hour rolling average temperatures.

(e) A discussion identifying the frequency and methods for recalibrating the instruments you will use for monitoring these parameters.

The following discusses the frequency and methods for recalibrating instruments to be used for monitoring parameters.

- On an annual basis, Pogo uses certified standard weights to confirm the scale's accuracy is ± 1 percent of the incinerator's maximum load weight limit.
- ACS, Inc. performs an annual inspection and maintenance service on the incinerator during which all systems, including the electronic timers, are verified for accuracy.
- ACS, Inc. performs an annual inspection and maintenance service on the incinerator during which the thermocouples are checked for accuracy and replaced as necessary.